Technical Note:
GPAS Governance Namespace Description

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1 Introduction

This paper briefly describes the organization of the Geospatial Publicly Available Specifications (GPAS) governance namespace in the Metadata Registry (MDR) component of the Department of Defense (DoD) Data Services Environment. The purpose of the GPAS governance namespace is to provide a configuration-controlled copy of publicly available geospatial standards, specifications, schemas, and related documents that are available through the Internet.

By providing these documents on the MDR, operations which otherwise do not have access to the Internet (*e.g.,* Disconnected, Intermittent, and Low-bandwidth (DIL) or enclave environments) will be able to access these code list dictionaries through copies of the MDR hosted locally or on [Internet] disconnected networks.

In addition, this namespace provides a repository for publicly available documents that is not dependent upon non-DoD assets.

2 GPAS Governance Namespace

The GPAS namespace is governed as part of the DODENT (DoD Enterprise) governance namespace. Access to the content of the GPAS governance namespace through the MDR web-browser interface is through the path:

Governance Namespaces → DODENT → GPAS

Because the GPAS governance namespace is used as a repository of publicly available standards, the content of the GPAS governance namespace is organized by the publishing organization for a given specification.

The initial GPAS hierarchy and the corresponding responsible standards organization is listed in Table 1. For each organization, the name of the sub-division within the GPAS governance namespace is listed. In addition, the right-most column lists the URL used for publication of the organization's schemas on the Internet. Additional sub-divisions of the GPAS governance namespace are added as additional requirements for specifications, and their publishing organizations, are identified.

Table 1 - GPAS Specification Organization

Publishing Organization	GPAS Division	Internet URL Reference
Open Geospatial Consortium, Inc. (OGC)	ogc	http://schemas.opengis.net
ISO Technical Committee 211 Geographic information/Geomatics	iso	http://www.isotc211.org/schemas[1]
World Wide Web Consortium (W3C)	w3	http://www.w3.org

[1] Many ISO TC211 XML schemas are also published through the ISO Publicly Available Standards web page: http://standards.iso.org/ittf/PubliclyAvailableStandards.

3 Referencing GPAS Schemas

Extensible Markup Language (XML) schemas define the structure and syntax of XML instance documents. XML schema definition files (XSD) are used by many standards development organizations to define the content of XML instance documents that are conformant with their standards and specifications. In order to validate an XML instance document, access to the XSD is required. The GPAS governance namespace provides a mechanism for making XSD files available for DoD/IC users in environments where a copy of the MDR is available, but direct access to the Internet is not.

For each of the organization's specifications maintained in the GPAS namespace, a Uniform Resource Locator (URL) is published to allow any corresponding schema document(s) to be directly accessible through the MDR. The general form of the URL for accessing a schema through the GPAS governance namespace on the MDR is:

http://metadata.ces.mil/mdr/ns/GPAS/schemas

For referencing XML schemas published in the GPAS governance namespace, the organization divisions identified in Table 1 are appended to the base schema location URL. The directory hierarchy used by the publishing organization for a given set of schemas is replicated for the schemas published in the GPAS governance namespace. Examples of the GPAS schema locations for each of the organizations identified in Table 1 are listed in Table 2.

Table 2 - Example GPAS Schema Locations

Organization	Example Schema Location URLs
OGC	http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.2.1/gml.xsd http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.1.1/base/gml.xsd
ISO TC211	http://metadata.ces.mil/mdr/ns/GPAS/schemas/iso/19139/DTS_2005/gmd/gmd.xsd http://metadata.ces.mil/mdr/ns/GPAS/schemas/iso/19139/TS_2007/gmx/catalogues.xsd
W3C	http://metadata.ces.mil/mdr/ns/GPAS/schemas/w3/1999/xlink/xlinks.xsd

XML schemas developed for general use within the DoD/IC or for a specific community of interest will be able to include or import (as appropriate) these publicly available schemas directly from the MDR.

Figure 1 illustrates how the schema location for the MDR-hosted Geography Markup Language (GML) 3.1.1 XML schema is identified in an XSD.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
   xmlns:gml="http://www.opengis.net/gml" version="0.1">
  <xs:import namespace="http://www.opengis.net/gml"
        schemaLocation="http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.1.1/base/gml.xsd"/>
  <!-- Schema content omitted -->
</xs:schema>
```

Figure 1 - Example Import of a GPAS-registered XML Schema

In an instance document based on a schema that has been registered (hosted) in the GPAS governance namespace, the schema location in the XML instance document can reference the MDR URL address corresponding to that schema. This is illustrated in Figure 2.

```
<?xml version="1.0" encoding="UTF-8"?>
<gml:Dictionary xmlns:gml="http://www.opengis.net/gml"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.opengis.net/gml
                        http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.1.1/base/gml.xsd">
  <!-- XML instance document content omitted -->
</gml:Dictionary>
```

Figure 2 - Example schemaLocation Usage of a GPAS-registered XML Schema

NOTE: The *xsi:schemaLocation* attribute value is composed of two strings. The first string in the example above (*http://www.opengis.net/gml*) is the XML namespace. The second string (*http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.1.1/base/gml.xsd*) is the URL of the XML schema definition document that may be used to validate the instance document. The two strings are space-separated.

4 Modifications to Publicly Available Schemas

XML schemas published through the GPAS namespace will not be materially altered. The only modification that *may* be made is the alteration of the schema location of imported and included schemas required by the XML schema. There are two cases where the schema location will need to be altered:

1. The published schema uses an absolute URL for an imported or included schema, and
2. The published schema uses a local or duplicate copy of a schema that is also published in the GPAS governance namespace.

Registration of publicly available schemas through the GPAS governance namespace is intended to remove the dependency of any of the published schemas on access to non-DoD/IC assets. Where an XML schema references another XML schema through an absolute URL, the reference is changed to be relative to the XML schema within the GPAS governance namespace (this implies that the referenced schema has been registered in the GPAS governance namespace). This is intended to make GPAS-registered schemas “self-contained”, so that they can be reused without dependencies on non-DoD/IC assets. The fragment in Figure 3 illustrates this change. The *import* statement (in red) is deleted and replaced with the *import* statement (in green) that follows it. The example file is:

http://metadata.ces.mil/mdr/ns/GPAS/schemas/iso/19139/TS_2007/gss/geometry.xsd

and the GML file to be imported is:

http://metadata.ces.mil/mdr/ns/GPAS/schemas/ogc/gml/3.2.1/gml.xsd

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:gco="http://www.isotc211.org/2005/gco"
    xmlns:gml="http://www.opengis.net/gml"
    xmlns:gss="http://www.isotc211.org/2005/gss"
    targetNamespace="http://www.isotc211.org/2005/gss"
    elementFormDefault="qualified" version="0.1">
  <xs:import namespace="http://www.opengis.net/gml/3.2"
        schemaLocation="http://schemas.opengis.net/gml/3.2.1/gml.xsd"/>
  <xs:import namespace="http://www.opengis.net/gml/3.2"
        schemaLocation="../../../../ogc/gml/3.2.1/gml.xsd"/>
  <!-- schema content omitted -->
</xs:schema>
```

Figure 3 - Example Change of Absolute to Relative URL for an Imported Schema

For convenience, some XML schemas may exist on multiple sites or as parts of different sets of XML schemas. An example of this is the XML Linking Language (XLink) schema based upon the corresponding W3C recommendation. During development of GML, for example, no XSD for XLink was published by W3C. As a result, the GML development team created a local-copy XSD for XLink.

The XLink XSD is registered (hosted) in the GPAS governance namespace through the *w3* directory. References to it within the GPAS-registered GML schemas have been changed ***from*** the copy otherwise expected to be found in the *ogc* directory ***to*** the copy maintained in the *w3* directory.

For example, both the family of TC211 schemas and the family of OGC schemas contain an XLink XSD file in their directory hierarchy. To eliminate this redundancy in the GPAS governance namespace, the xlinks.xsd file is registered in the *w3* GPAS sub-division and is accessible using the URL:

http://metadata.ces.mil/mdr/ns/GPAS/schemas/w3/1999/xlink/xlinks.xsd.

An example result of redundancy elimination is illustrated in Figure 4, from the file:

http://metadata.ces.mil/mdr/ns/GPAS/schemas/iso/19139/TS_2007/gco/gcoBase.xsd

The *import* statement (in red) is deleted and replaced with the *import* statement (in green) that follows it, which (correctly) references the GPAS-registered xlinks.xsd file.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.isotc211.org/2005/gco"
    elementFormDefault="qualified" attributeFormDefault="unqualified"
    xmlns:gco="http://www.isotc211.org/2005/gco"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:gml="http://www.opengis.net/gml">
  <xs:import namespace="http://www.w3.org/1999/xlink"
        schemaLocation="../xlink/xlinks.xsd"/>
  <xs:import namespace="http://www.w3.org/1999/xlink"
        schemaLocation="../../../../w3/1999/xlink/xlinks.xsd"/>
  <!-- schema content omitted -->
</xs:schema>
```

Figure 4 - Example Change of URL Reference to Common URL

5 XML Schema Namespace Identifiers

The term *Namespace* can have two connotations when dealing with the MDR.

The MDR is used to manage *Governance Namespaces* which are used to register documents, schemas, etc. in logical groupings for discovery and reuse by the DoD/IC community. The GPAS is an example of an MDR *Governance Namespace*.

XML Namespaces are used to organize XML schema definitions for reuse. Names of XML objects (element, complex type, etc.) are required to be unique within an XML namespace for that type of object. The *XML Namespace* for the Geography Markup Language (through version 3.1.1) is encoded as a URL and is:

http://www.opengis.net/gml

Within this XML namespace, there can be only one element definition for the element named *Point*. This ensures that, within the GML namespace, the element *Point* has one definition. It also allows other XML namespaces to define an element named *Point* with a (potentially different) meaning specific to that namespace that does not conflict with the same-named element in the GML namespace.

XML Namespaces are identified using a Uniform Resource Identifier (URI). The URI is used to identify the XML schema namespace for which the schema contains definitions. The URI can be implemented as either a Uniform Resource Name (URN) or as a URL, depending upon the preference of the schema author. For example, the Intelligence Community Information Security Markup (ICISM) schema uses a URN to identify the ICISM namespace which is:

urn:us:gov:ic:ism

When a URL is used, often it is the case that the URL is crafted so that it can also be used as a web reference related to the XML namespace. This is the case of the GML namespace identifier listed above. This dual use of a URL as both an XML namespace and as a web resource address is a *convenience* and is not required for XML schema and instance document validation.

The *XML Namespace* identifier chosen by the organization publishing the schemas registered in the GPAS is part of the schema content and should not be changed. For this reason, **XML schema namespace identifiers for publicly available schemas are unchanged for schemas registered in the GPAS governance namespace.**